

What is claimed is:

1. A data communications system in which a transmitting side relay device and a receiving side relay device
5 are connected to a first and second networks, respectively, where a prescribed transfer unit is consecutively transferred at a specific transfer rate and with prescribed transfer delay, and a data stream generated as a series of the transfer units are
10 communicated as a series of datagram type packets, including the transfer unit, via a third network, said transmitting side relay device, comprising:

an additional information generation unit generating additional information, including
15 information about relationship between each transfer unit and the data stream based on the characteristics of the data stream;

20 a packet generation unit generating a packet by attaching both the additional information and header information suited to be transferred in the third network when each transfer unit composing the data stream is inputted; and

25 a transmitting unit transmitting the packet to the third network according to prescribed procedures, and

said receiving side relay device, comprising:
 a separation unit separating the additional
 information and a transfer unit which are included in
 the packet received from the third network;

5 an analysis unit analyzing the additional
 information separated by the separation unit;

 a reproduction unit locating information that
 is included in the transfer unit received from the
 separation unit in a correct position of the data stream
10 and reproducing the data stream based on an analysis
 result by the analysis unit; and

 an outputting unit outputting the data stream
 reproduced by the reproduction unit to the second
 network.

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2. The data communications system according to claim
 1, wherein said additional information generation unit
 generates additional information, including a
 sequence number for indication of a transmitting order
20 of each transfer unit.

25 3. The data communications system according to claim
 1, wherein said additional information generation unit
 generates additional information, including a time
 stamp for indicating a transmission time of each

transfer unit.

4. The data communications system according to claim 1, wherein a data stream transferred in the first and 5 second networks has a prescribed cyclical structure, and

10 said additional information generation unit generates additional information, including a cycle to which each transfer unit belongs and a number for indicating an order in the cycle based on the cyclical structure that is possessed by the data stream.

15 5. the data communications system according to claim 1, wherein a data stream transferred in the first and second networks is digital video data, and

20 said additional information generation unit generates additional information, including both a frame number for indicating each video frame composing the digital video data and a data block number for indicating a data block composing the video frame.

25 6. The data communications system according to claim 1, wherein a data stream transferred in the first and second networks is composed of transfer units obtained by arranging a plurality of types of different unit

information in a prescribed format, and
said additional information generation unit
generates information, including type information
about a type of unit information included each of the
5 transfer unit.

7. The data communications system according to claim
1, wherein a data stream transferred in the first and
second networks is digital video data, and
10 said additional information generation unit
generates additional information, including
information about combination between video
information unit and audio information unit that are
included in each transfer unit.

15
8. The data communications system according to claim
1, further comprising

a generation control unit controlling a
generating operation of a packet corresponding to each
20 transfer unit when a transmission mode is inputted,
and wherein said additional information generation
unit generates additional information, including
information about a process content of each transfer
unit instructed by said generation control unit.

9. The data communications system according to claim 8, wherein a data stream transferred in the first and second networks is digital video data, and

5 said generation control unit judges whether respective pieces of audio and video data, which are elements composing digital video data of each frame, should be designated as data to be transmitted depending on a transmission mode and instructs packet generation unit to generate a packet; selectively including the
10 data to be transmitted, and

said additional information generation unit generates additional information, including information about a type of data to be transmitted.

15 10. The data communications system according to claim 9, wherein said generation control unit designates only audio data included each transfer unit or only a transfer unit, including audio data, as a transmission target and instructs a packet generating operation of
20 the transmission target when a transmission mode for indicating that audio data included in digital video data should be transmitted.

11. The data communications system according to claim
25 8, further comprising

a transmitting control unit controlling a transmission rate used when said transmitting unit transmits a packet, including each transfer unit, to make a prescribed transmission rate corresponding to 5 a transmission mode when the transmission mode is inputted.

12. A data communications system according to claim 1, wherein said transmitting unit comprises
10 a transmitting unit sequentially transmitting each packet inputted as a packet to be transmitted to the third network; and
a target input unit inputting each packet generated by said packet generation unit to the 15 transmitting unit as a packet to be transmitted and also inputting packets generated by duplicating a part of the packets as packets to be transmitted.

13. The data communications system according to claim 20 12, wherein immediately after inputting a packet to be repeatedly transmitted to said transmitting unit as a transmission target, said target input unit repeatedly inputs the packets to the transmitting unit as packets to be transmitted as many times as required.

14. The data communications system according to claim 12, wherein a data stream transferred in the first and second networks has a prescribed cyclical structure, and

5 said target input unit stores in advance one data stream cycle of copies of packets to be repeatedly transmitted and inputs the copies of the packets to be repeatedly transmitted to said transmitting unit after inputting packets corresponding to all transfer
10 units composing one cycle of data stream.

15. The data communications system according to claim 12, wherein a data stream transferred in the first and second networks has a prescribed cyclical structure,
15 and

 said target input unit stores in advance all packets generated by said packet generation unit and the copies of packets to be repeatedly transmitted of one cycle of data streams and inputs all the stored
20 packets to said transmitting unit at a random order.

16. The data communications system according to claim 1, wherein said reproduction unit of a receiving side relay device comprises:

25 a receiving buffer, which is structured to make

a multi-dimension array consisting of elements with prescribed data length, for storing each transfer unit separated by said separation unit in a storage place corresponding to a designated element; and

5 a writing control unit generating a write instruction for indicating a corresponding element of the multi-dimension array composing said receiving buffer based on the analysis result of additional information corresponding to each of the transfer unit
10 composing said receiving buffer.

17. The data communications system according to claim 16, wherein a data stream transferred in the first and second networks has a prescribed cyclical structure,
15 and

 said receiving buffer has a multi-dimension array structure corresponding to the cyclical structure of the data stream.

20 18. The data communications system according to 16, wherein said additional information generation unit of a transmitting side relay device generates additional information, including a sequential number for indicating a transmission order of each transfer
25 unit, and

5 said reproduction unit of receiving side relay
device comprises:

10 a first evaluation unit evaluating
integrity of data stored in said receiving buffer
based on continuity of sequence numbers that is
included in additional information separated
from each packet that reaches said receiving side
relay device; and

15 a compensation unit compensating for data
stored in said receiving buffer based on an
evaluation result on integrity of data stored
in said receiving buffer.

19. The data communications system according to claim
15 16, wherein a data stream transferred in the first and
second networks is composed of transfer units obtained
by arranging a plurality of types of different unit
information in a prescribed format,

20 said additional information generation unit
generates additional information, including type
information about a type of unit information that is
included in each of the transfer unit and

25 said reproduction unit of the receiving side
relay device comprises:

25 a counter unit classifying transfer units

included in each packet that reaches said receiving side relay device for each unit information based on an analysis result of additional information separated from each packet;

5 a second evaluation unit evaluating the integrity of data stored in said receiving buffer based on a counting result of the counter unit; and

10 a compensation unit compensating for data stored in said receiving buffer based on an evaluation result of integrity of data stored in said receiving buffer.

20. The data communications system according to claim
15 19, wherein a data stream transferred in the first and second networks is digital video data, and
 said counter unit classifies packets, including the audio information unit of digital video data.

20 21. The data communications system according to claim
19, wherein a data stream transferred in the first and second networks is digital video data, and
 said counter unit classifies and counts packets, including video information data of digital video data.

22. The data communications system according to claim 19, wherein a data stream transferred in the first and second networks is digital video data, and
said counter unit classifies and counts packets,
5 including header information of digital video data.

23. The data communications system according to claim 19, wherein said compensation unit comprises:
a compensation information storage unit storing
10 appropriate compensation information for each transfer unit; and
a composition unit composing a data stream consisting of a series of transfer units by selecting either each transfer unit stored in said receiving
15 buffer or corresponding compensation information based on an evaluation result of said second evaluation unit.

24. The data communications system according to claim 20 16, wherein said receiving side relay device comprises:
a delay amount storage unit storing a prescribed delay amount; and
a target determination unit receiving position information about a position in an original data stream
25 occupied by the relevant transfer unit as an analysis

result of additional information separated from the latest arrival packet, determining a list of a series of transfer units to be reproduced by said reproduction unit as a unit of size of an array composing 5 said receiving buffer based on a result obtained by subtracting the delay amount from the position information and designating the relevant array for said reproduction unit.

10 25. The data communications system according to claim 24, wherein a data stream transferred in the first and second networks is digital video data,
said additional information generation unit of said transmitting side relay device generates 15 additional information, including a frame number for indicating each video frame composing the digital video data,
20 said receiving buffer stores a transfer unit, including information composing each frame, as each element of an array in relation to a plurality of video frames,
25 said delay amount storage unit stores a prescribed number of frames as a delay amount and said target determination unit receives the frame number from said analysis unit as position

information and determines an array to be reproduced based on both this frame number and the prescribed number of frames.

5 26. The data communications system according to claim
24, wherein said additional information generation
unit of said transmitting side relay device generates
additional information, including a time stamp for
indicating a transmission time of each transfer unit,
10 said delay amount storage unit stores a
prescribed time as a delay amount, and

 said target determination unit receives the time
stamp from said analysis unit as position information
and determines an array to be reproduced based on both
15 a time indicated by this time stamp and the delay time.

27. The data communications system according to claim
24, wherein said receiving side relay device comprises
a modification unit modifying the delay amount stored
20 in said delay amount storage unit when a modify
instruction is inputted.

28. The data communications system according to claim
1, wherein each of said transmitting and receiving side
25 relay devices comprises a control communications unit

transmitting/receiving a control packet in a prescribed format via the third network.

29. The data communications system according to claim
5 28, wherein said transmitting side relay device comprises:

a generation control unit controlling a generating operation of a packet corresponding to each transfer unit when a transmission mode is inputted;

10 a transmitting control unit controlling a transmission rate used when said transmitting unit transmits a packet, including each transfer unit, to the third network to make a prescribed transmission rate corresponding to a transmission mode when the
15 transmission mode is inputted; and

a management information analysis unit analyzing management information that is included in a control packet received via said control communications unit of a self-device and inputting an appropriate transmission mode to both the generation control unit and the transmitting control unit based
20 on this analysis result, and

said receiving side relay device comprises:

25 a management information collecting unit collecting management information about quality

of a data stream received by the self-device via the third network based on an analysis result obtained by said analysis unit or information about a reproduction process of said reproduction unit and transmitting the information to said transmitting side relay device as a control packet via said control communications unit of the self-device.

10 30. A data communications system where a transfer unit in a prescribed format transferred in a first network, which is one of a plurality of physically independent networks is relayed by a transmitting side relay unit installed in relation to the first network, another 15 relay network and a receiving side relay unit in relation to a second network, which is at least one of other independent networks,

20 said transmitting side relay unit comprises:

25 an extraction unit extracting a transfer unit to be transmitted to the second network;

30 a transformation unit applying a prescribed operation to control information included in the extracted transfer unit and generating a relay transfer unit;

35 a reshaping unit reshaping the relay

transfer unit into a packet in a format based on transmitting procedures of the relay network, that is addressed to said receiving side relay device installed in relation to the second network; and

5

a first transmitting unit outputting each packet reshaped by the reshaping unit to the relay network, and

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the receiving side relay unit comprises:

10

a separation unit breaking down the packet received via the relay network and separating the relay transfer unit from the packet;

15

a generation unit applying a prescribed operation to the relay transfer unit obtained by the separation unit and re-generating a transfer unit, including control information suitable for a transmission process in the second network; and

20

a second transmitting unit transmitting the transfer unit generated by the generation unit to the second network.

25

31. The data communications system according to claim 30, wherein said transformation unit of said transmitting side relay unit comprises a first

rewriting unit rewriting at least a part of control information included each transfer unit and outputting the transfer unit as a relay transfer unit.

5 32. The data communications system according to claim 31, wherein each transfer unit transferred in the first and second networks includes time information required to synchronize transfer operations as a part of control information, and

10 said first rewriting unit replaces time information included in each transfer unit with invalid data neglected in a transfer process of the second network.

15 33. The data communications system according to claim 30, wherein said generation unit of said receiving side relay unit comprises a second rewriting unit rewriting at least a part of control information included in each relay transfer unit into information suitable for the 20 second network and outputting the transfer unit as a transfer unit to be transmitted to the second network.

34. The data communications system according to claim 33, wherein each transfer unit transferred in the first 25 and second networks includes time information required

to synchronize transfer operations as a part of control information, and

5 said second rewriting unit replaces information about a transmission time included in control information with time information valid in a network of self-device side.

35. The data communications system according to claim 33, wherein each transfer unit transferred in the first 10 and second networks includes channel identification information about the transmission route as a part of control information, and

15 said generation unit comprises a storage unit storing correspondence information about correspondence between channel identification information assigned on the first network side and channel identification information assigned on the second network in each communications conducted between a node belonging to the first network and a 20 node belonging to the second network via a relay network, and

said rewriting unit rewrites channel identification information included in a relay transfer unit based on the correspondence information.

36. The data communications system according to claim
30, wherein each transfer unit transferred in the first
and second networks includes a prescribed fixed
information as a part of control information for each
5 of the transmission routes,

 said transformation unit of said transmitting
 side relay unit comprises a deletion unit deleting the
 fixed information and outputting the transfer unit as
 a relay transfer unit, and

10 said generation unit of said receiving side relay
 unit comprises addition unit attaching the fixed
 information to each relay transfer unit as a part of
 corresponding control information and outputting the
 transfer unit as a transfer unit to be transmitted to
15 the second network.

37. The data communications system according to claim
30, wherein a series of transfer units transferred in
the first and second networks are composed of valid
20 transfer units, including information to be
transferred and empty transfer units, including no
information to be transmitted, and

 said reshaping unit of a transmitting side relay
 unit comprises:

25 a first selection unit selecting valid

transfer units, including information to be transferred as a transmission target to be transmitted to a relay network; and

5 a conversion unit converting the selected transfer unit to be transmitted into a packet suitable for a relay network.

38. The data communications system according to claim 37, wherein said second transmitting unit of said 10 receiving side relay unit comprises:

a transmitting unit transmitting the transfer unit received as a transmission target to the second network; and

15 an insertion unit inserting an empty transfer unit, including no information to be transferred, in the series of transfer units received from said generation unit according to prescribed rules and inputting the series of transfer units to said transmitting unit as a transfer unit string to be 20 transmitted.

39. The data communications system according to claim 30, wherein a series of transfer units transferred in the first and second networks are composed of valid 25 transfer units, including information to be

transferred, and empty transfer units, including no information to be transmitted, and

 said reshaping unit of a transmitting side relay unit comprises:

5 a second selection unit selecting all transfer units or a valid transfer unit, including information to be transferred, as a transmission target when a select instruction is inputted; and

10 a conversion unit converting the transfer unit selected as a transmission target into a packet suitable for a relay network.

40. The data communications system according to claim
15 30, wherein said reshaping unit of said transmitting side relay unit comprises:

 a third selection unit identifying a correct transfer unit based on conditions to be met by a transfer unit in the first network and selecting the transfer unit as a transmission target to be transmitted to a relay network; and

 a conversion unit converting the transfer unit selected as a transmission target into a packet suitable for the relay network.

41. The data communications system according to claim 30, wherein each of the first and second networks selects a route node from nodes belonging to a respective network and this route node manages 5 transmission in the respective network when a prescribed operation is performed, and

each of said transmitting and receiving side relay unit comprises:

10 a judgment unit judging whether a self-device is designated as a route node when a prescribed operation is performed; and

a resetting unit performing the prescribed operation if the judgment unit judges that the self-device is a route node.

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42. The data communications system according to claim 30, wherein the first network confirms delivery of asynchronous transfer units transmitted from each node belonging to the network to another node from time to 20 time by a prescribed reply transfer unit, and

25 said transmitting side relay unit comprises a reply acting unit returning a transfer unit equivalent to the prescribed reply transfer unit to an originating node of the asynchronous transfer unit in reply to an asynchronous transfer unit extracted by said

extraction unit.

43. The data communications system according to claim 30, wherein each of a plurality of independent networks 5 assigns a node number to each node belonging to the network when a prescribed operation is performed,

 said transmitting side relay unit comprises:

10 a first node number storage unit storing both identification information peculiar to each node belonging to the first network, and correspondence between an invariable virtual node number of each node belonging to the first network and a node number assigned in the first network; and

15 a first number update unit collecting a node number assigned to each node in the first network and updating a content of the first number storage unit when a prescribed operation is performed,

20 said transformation unit replaces a node number that is included in the transfer unit extracted by said extraction unit as information about a transmitting source with a corresponding virtual node number stored in the first number storage unit,

25 said receiving side relay unit comprises:

a second number storage unit storing both identification information peculiar to each node belonging to the second network, and correspondence between an invariable virtual node number of each node belonging to the second network and a node number assigned in the second network; and

10 a second number update unit collecting a node number assigned to each node in the second network and updating a content of the second number storage unit when a prescribed operation is performed, and

15 said generation unit replacing the virtual node number included in a relay transfer unit as information about a destination with a corresponding node number stored in the second number storage unit.

44. A data communications system where a transmitting side relay unit installed in relation to a first network, which is one of a plurality of physically independent networks for transferring structure data with a prescribed regular structure in prescribed transfer units, transmits a transfer unit transferred in the first network to another relay network and a receiving side relay unit installed in relation to a second

network, which is at least one of the plurality of independent networks, relays the transfer unit transmitted to the relay network to the second network, said transmitting side relay unit comprising:

5 a generation unit generating a datagram type relay packet, including the transfer unit, and addressed to the receiving side relay unit when a transfer unit transferred in the first network is inputted; and

10 a transmitting unit transmitting the relay packet to the relay network, and
said receiving side relay unit comprises:

15 a decomposition unit breaking down the relay packet received via the relay network and separating the transfer unit;

20 a reproduction unit reproducing structure data using the transfer unit obtained by the decomposition unit based on information about the prescribed regular structure to be possessed by the structure data; and

 an outputting unit outputting the structure data to the second network in the prescribed transfer units.

25 45. The data communications system according to claim

44, wherein digital video data are transferred in the prescribed transfer units in the plurality of independent networks,

5 said reproduction unit of said receiving side relay unit comprises:

a detection unit detecting information about a head of a video frame included in the inputted transfer unit;

10 a regeneration unit regenerating one video frame of structure data from the transfer unit received from said decomposition unit during a cycle from when the head of the video frame is detected by said detection unit until a head of a subsequent video frame is detected;

15 a collection unit collecting regeneration information about an information amount included in the structure data regenerated by said regeneration unit based on a transfer unit inputted to said regeneration unit;

20 an evaluation unit evaluating integrity of the structure data regenerated by said regeneration unit based on both the detection result of the detection unit and the regeneration information; and

25 a result output unit outputting the

structure data regenerated by the regeneration unit as a reproduction result when the evaluation of said evaluation unit is obtained.

5 46. The data communications system according to claim
45, wherein said collection unit comprises counter unit
counting a number of transfer units inputted to said
regeneration unit during a cycle from when from a head
of a video frame is detected until a head of a subsequent
10 video frame is detected and sequentially outputting
regeneration information, including this counter
value, and

15 said evaluation unit comprises first judgment
unit monitoring a counter value included in the
regeneration information, and judging that the
structure data regenerated by said regeneration unit
is incomplete when the counter value exceeds a
prescribed threshold value and outputting the judgment
as an evaluation result.

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47. The data communications system according to claim
45, wherein said collection unit comprises a
measurement unit measuring an information amount that
is included in the structure data regenerated by said
25 regeneration unit based on both the detection result

of said detection unit and information about data length that is included in each transfer unit inputted to said regeneration unit and outputting regeneration information, including this measurement result,

5 said evaluation unit comprises:

 an estimation unit estimating a number of transfer units contributing to a regeneration process of said regeneration unit based on the measurement result included in said regeneration information; and

10 a second judgment unit judging whether an information amount lost when said regeneration unit regenerates structure data, is allowable, based on a comparison result between the estimation result of said estimation unit and the prescribed threshold value and outputting this judgment result as an evaluation result, and

15 said result output unit outputs the structure data regenerated by said regeneration unit as a valid reproduction result and provides the result for an output process to the second network of said output unit.

25 48. The data communications system according to claim

44, wherein digital video data are transferred in prescribed units in the plurality of independent networks,

5 said reproduction unit of said receiving side relay unit reproduces structure data in units of video frames using the transfer unit received from said decomposition, and

 said output unit comprises:

10 a first storage unit storing one video frame of the structure data reproduced by said reproduction unit;

 a second storage unit storing one video frame of structure data to be transmitted by said transmitting unit;

15 a transmitting unit transmitting each transfer unit stored in the second storage unit to the second network according to prescribed procedures;

20 a third judgment unit referring to the first storage unit and judging whether new structure data are stored, every time said transmitting unit transmits one video frame of structure data; and

25 an input unit inputting the structure data stored in the first storage unit to the second

storage unit, based on a judgment result of the third judgment.

49. The data communications system according to claim
5 44, wherein digital video data are transferred in prescribed transfer units in the plurality of independent networks,

10 said transmitting side relay unit comprises:
a frame counter unit counting video frames transferred as structure data in the first network; and
a generation control unit controlling both stop and restart of a packet generating operation of said generation unit.

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50. The data communications system according to claim 49, wherein said transmitting unit of said transmitting side relay unit comprises:

20 a packet storage unit storing a series of packets generated by said generation unit;
an interval calculation unit calculating a transmission interval when the packets should be transmitted to a relay network based on a thinning-out ratio designated by a thin-out instruction; and
25 a packet output unit sequentially extracting

packets stored in the packet storage unit and transmitting the packets to a relay network at each of the transmission intervals.

5 51. A system for conducting communications using a plurality of network routes with different communications delay, comprising:

10 a transmitting unit transmitting a plurality of split communications data with additional information for split communications;

a receiving unit uniting, synchronizing and receiving the plurality of split communications data based on the additional information.

15 52. The system according to claim 51, wherein the network is the Internet and the communications data is video data.

53. The system according to claim 51, wherein 20 each of a plurality of senders has said transmitting unit, exchanges information about the additional information among the senders and transmits communication data after attaching additional information with regularity unified among the 25 plurality of all senders.

54. The system according to claim 51, wherein
each of a plurality of senders has said transmitting
unit, independently transmits communications data and
5 each of a plurality of receivers having said receiving
unit synchronizes and receives communications data by
exchanging information about the additional
information among the receivers.

10 55. The system according to claim 51, wherein
each of a plurality of senders has said transmitting
unit, independently transmits communications data,
each of a plurality of receivers having said receiving
unit comprises a synchronization unit adjusting a
15 synchronization state by observing a reproduction
state of receiving data and secures synchronization
of communications data by adjusting the
synchronization by said synchronization unit.

20 56. The system according to claim 51, wherein
the additional information is one of a channel number
of communications data, an origination time of
communications data and a generation time of
communications data.

57. The system according to claim 51, wherein existence/non-existence of specific data, such as voice, pictures, etc., or information about a specific pattern is used for the additional information.

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58. The system according to claim 51, wherein said transmitting unit divides communications data into a plurality of split data and transmits the split data via a plurality of network routes.

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59. The system according to claim 51, wherein the division is dynamically conducted based on network information.

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60. The system according to claim 51, wherein the network information is collected two or more times consecutively and it is judged whether a division method should be modified, by comparing at least two pieces of the collected network information.

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61. The system according to claim 60, wherein difference between the at least two or more pieces of network information is expressed as a numeric value and a division method is modified if the numeric value is equal to or more than a threshold value.

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62. The system according to claim 59, wherein
either a packet loss ratio or a packet data amount
passing through each network interface is used for the
5 network information.

63. A transmitting device used in a system for
communicating via a plurality of network routes with
different communications delay, comprising
10 a transmitting unit transmitting a plurality of
pieces of split communications data with additional
information for split communications, including
information required to synchronize on a receiving side,
via the plurality of network routes.

15 64. A receiving device used in a system for communicating
via a plurality of network routes with different
communications delay, comprising
a receiving unit uniting and synchronizing a

20 plurality of split communications data based on
additional information required to synchronize on a
transmitting side.

25 65. A method for communicating via a plurality of network
routes with different communications delay,

comprising:

transmitting a plurality of split communications data with additional information for split communications via the plurality of network routes;

5 and

uniting, synchronizing and receiving a plurality of split communications data based on the additional information.

10 66. The method according to 65, wherein the network is the Internet and the communications data is video data.

67. The method according to 65, wherein 15 each of a plurality of senders executes the transmitting step, exchanges information about said additional information among the senders, attaches additional information with regularity unified among the plurality of all transmitters and transmits to 20 communications data transmitted by each sender.

68. The method according to claim 65, wherein each of a plurality of senders executes the transmitting step, independently transmits communications data and 25 a plurality of receivers executing the receiving step

synchronizes and receives the communications data by exchanging information about the additional information among the receivers.

5 69. The method according to claim 65, wherein each of a plurality of senders executes the transmitting step, independently transmits communications data, and each of a plurality of receivers executing said receiving step further comprises a synchronization 10 step adjusting a synchronization state by observing a reproduction state of receiving data and secures synchronization of communications data by making an adjustment in the synchronization step.

15 70. The method according to claim 65, wherein the additional information is one of a channel number of communications data, an origination time of communications data and a generation time of communications data.

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71. The method according to claim 65, wherein either existence/non-existence of specific data, such as voice, pictures, etc., or a specific pattern is used for the additional information.

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72. The method according to claim 65, wherein in the transmitting step, communications data is divided into a plurality of pieces of split data and is transmitted via a plurality of network routes.

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73. The method according to claim 72, wherein the division is dynamically conducted based on network information.

10 74. The method according to claim 73, wherein the network information is collected two or more times consecutively and it is judged whether a division method should be modified by comparing at least two pieces of the collected network information.

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75. The method according to 73, wherein difference between the at least two or more pieces of network information is expressed as a numeric value and a division method is modified if the numeric value 20 is equal to or more than a threshold value.

76. The method according to claim 73, wherein either a packet loss ratio or a packet data amount passing through each network interface is used for the 25 network information.